E90

OPERATORS MANUAL

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EC DECLARATION OF CONFORMITY

1. MANUFACTURER

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2. PRODUCTS

E90
E45
E25
E15
E4-75

3. STANDARDS

Safety	-	EN 60065: 2003
Relevant Specification used as Basis of Tests	-	EN55103-1:1996 EN55103-2:1996

4. CATEGORY

Professional apparatus for use in Commercial Light Industrial and controlled EMC environments.

5. CE MARKING

All products are marked in accordance with the relevant statutory requirements.

6. SIGNATORIES

I.R. McCarthy (Managing Director) .....

T.A. Clarke (Technical Director) .....

Issued October 2008

Important Safety Instructions

1) Read and keep these instructions.
2) Heed all warnings.
4) Follow all instructions.
5) Do not block any ventilation openings, install in accordance with the manufacturer's instructions.
6) Unplug this apparatus during lightning storms or when unused for long periods of time.
7) Clean only with a dry cloth.
8) Do not use this apparatus near water; the apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases shall be placed on the apparatus.
9) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as if the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Installation Instructions: ELECTRICAL

The amplifier has been manufactured to comply with your local power supply requirements, but before connecting the unit to the supply, ensure that the voltage (printed on the rear panel) is correct.

Make sure power outlets conform to the power requirements listed on the back of the unit. Damage caused by connecting to improper AC voltage is not covered by the warranty.

SAFETY WARNING

Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.

Where a MAINS plug or appliance coupler is used as the disconnect device, it should remain readily operable.

Where the amplifier is mounted in a rack and permanently connected to the mains, then the rack should be installed with a readily accessible connector or an ALL POLE circuit breaker with 3mm breaking distances.

This unit is fitted with a 3-wire power cord. For safety reasons, **THE EARTH LEAD SHOULD NOT BE DISCONNECTED IN ANY CIRCUMSTANCE**. If ground loops are encountered consult the section on 'Input Connections' later in this manual.

THE WIRING COLOURS ARE:

230V AREAS: EARTH = GREEN AND YELLOW
NEUTRAL = BLUE
LIVE = BROWN

120V AREAS: EARTH = GREEN
NEUTRAL = WHITE
LIVE = BLACK

WARNING To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

WARNING To prevent injury, this apparatus must be securely attached to the rack in accordance with the installation instructions

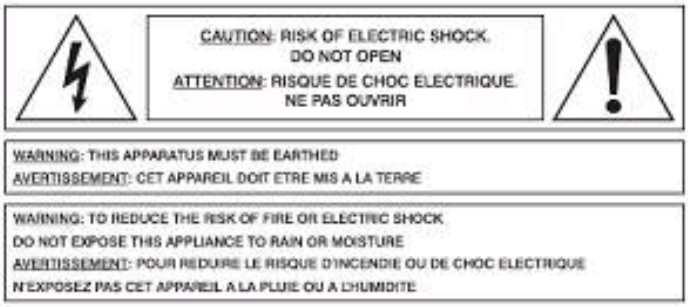
WARNING Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection

TO AVOID ELECTRICAL SHOCK DO NOT REMOVE COVERS. REFER ALL SERVICING TO QUALIFIED PERSONNEL.
DO NOT USE THE UNIT IF THE ELECTRICAL POWER CORD IS FRAYED OR BROKEN. The power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs and the point where they exit from the appliance.

ALWAYS OPERATE THE UNIT WITH THE AC GROUND WIRE CONNECTED TO THE ELECTRICAL SYSTEM GROUND. Precautions should be taken so that the means of grounding of a piece of equipment is not defeated.

DO NOT REMOVE THE LID. Removing the lid will expose you to potentially dangerous voltages. There are no user serviceable parts inside.

IMPORTANT SAFETY INSTRUCTIONS


CAUTION: RISK OF ELECTRIC SHOCK
DO NOT OPEN
ATTENTION: RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR
WARNING: THIS APPARATUS MUST BE EARTHED
AVERTISSEMENT: CET APPAREIL DOIT ETRE MIS A LA TERRE
WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK
DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE
AVERTISSEMENT: POUR REDUIRE LE RISQUE D'INCENDIE OU DE CHOC ELECTRIQUE
N'EXPOSEZ PAS CET APPAREIL A LA PLUIE OU A L'HUMIDITE

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

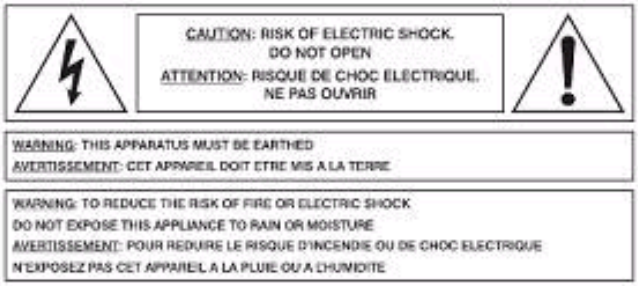
WARNING: Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.

WARNING: To prevent injury, this apparatus must be securely attached to the rack in accordance with the installation instructions.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings, install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources, such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
9. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the pint where they exit from the apparatus.
10. The mains circuit breaker shall remain readily accessible.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, tripod, bracket or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from a tip over.
13. Disconnect this apparatus during lightning storms or when unused for a long period of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as if the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.
16. To completely disconnect this equipment from the AC mains, disconnect the power cord from the mains circuit breaker.
17. Where the amplifier is mounted in a rack and permanently connected to the mains, then the rack should be installed with a readily accessible connector or an ALL POLE circuit breaker with 3mm breaking distances.
18. This unit is fitted with a 3-wire power cord. For safety reasons, THE EARTH LEAD SHOULD NOT BE DISCONNECTED IN ANY CIRCUMSTANCE.
19. The cooling fans suck cool air in through the front and blow hot air out at the rear of the unit through the ventilating grills. The front and rear of the amplifier should have free exposure to the air (i.e. in a rack leave the front and rear doors off), with 2cm air gap at the sides and top. IF AIR IS NOT ALLOWED TO ESCAPE FROM THE REAR, OVER-HEATING WILL OCCUR. Take care when mounting other equipment in the same rack.
20. The mains switch on the amplifiers only switches one pole of the mains supply, therefore for units with a detachable cord to be fully disconnected from the mains, the mains disconnect device (ie mains plug or mains coupler) should remain readily operable. For units with a fixed mains lead the external all pole circuit breaker with 3mm breaking distances is the disconnect device and therefore the installation of the amplifier shall be carried out in accordance with all the applicable installation rules.

INSTRUCTIONS DE SÉCURITÉ IMPORTANTES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Le symbole représentant un éclair fléché dans un triangle équilatéral a pour but d'alerter l'utilisateur de la présence d'une « tension dangereuse » non isolée à l'intérieur du boîtier, pouvant être d'une force suffisante pour constituer un risque d'électrocution.

Le point d'exclamation dans un triangle équilatéral a pour but d'alerter l'utilisateur de la présence d'instructions importantes concernant le fonctionnement et la maintenance, dans la documentation qui accompagne l'appareil.

ATTENTION: Appareils de construction de CLASSE I doit être raccordé au réseau électrique via une prise de courant reliée à la terre.

ATTENTION: Pour éviter toute blessure, cet appareil doit être solidement fixé à la torture, conformément aux instructions d'installation.

1. Lisez ces instructions.
2. Gardez ces instructions.
3. Faites attention à tous les avertissements.
4. Suivez toutes les instructions.
5. N'utilisez pas cet appareil près de l'eau.
6. Faites le ménage seulement avec un tissu sec.
7. Ne bloquez pas d'ouvertures de ventilation, installez conformément aux instructions du fabricant.
8. N'installez près d'aucunes sources de chaleur, comme les radiateurs, les registres de chaleur, les cuisinières ou d'autre appareil (en incluant des amplificateurs) qui produisent la chaleur.
9. Protégez la corde de pouvoir d'être marché sur ou pincé particulièrement aux prises de courant, les réceptacles d'avantage et la pinte où ils sortent de l'appareil.
10. Le disjoncteur de conduite principale restera sans hésiter accessible.
11. Utilisez seulement des attachements/accessoires spécifiés par le fabricant.
12. Utilisez seulement avec le chariot, le trépied, la parenthèse ou la table spécifiée par le fabricant, ou vendu avec l'appareil. Quand un chariot est utilisé, utilisez la prudence en déplaçant la combinaison de chariot/appareil pour éviter la blessure d'un bout.
13. Débranchez cet appareil pendant les tempêtes de foudre ou quand neuf pendant un long terme de temps.

14. Renvoyez tout l'entretien au personnel de service qualifié. L'entretien est exigé quand l'appareil a été nui de toute façon, comme si la corde de pouvoir provision ou la prise de courant sont nuis, le liquide a été déversé ou les objets sont tombés dans l'appareil, l'appareil a été exposé pour pleuvoir ou l'humidité, n'opère pas normalement, ou a été baissé.
15. N'exposez pas cet équipement au fait de tomber goutte à goutte ou au fait d'éclabousser et garantissez qu'aucun objet rempli des liquides, comme les vases, n'est placé sur l'équipement.
16. Pour complètement débrancher cet équipement de la conduite principale de courant alternatif, débranchez la corde de pouvoir du disjoncteur de conduite principale.
17. Où l'amplificateur est monté dans un égouttoir et en permanence raccordé à la conduite principale, alors l'égouttoir devrait être installé avec un connecteur sans hésiter accessible ou TOUT le disjoncteur de PÔLE avec 3 millimètres cassant des distances.
18. Cette unité est correspondue avec une corde de pouvoir de 3 fils. Pour les raisons de sécurité, l'AVANCE DE TERRE NE DEVRAIT ÊTRE DÉBRANCHÉE DANS AUCUNE CIRCONSTANCE.
19. Les ventilateurs engloutissent l'air frais par le front et soufflent l'air chaud à l'arrière de l'unité par les grils aérants. Le front et l'arrière de l'amplificateur devraient avoir l'exposition libre à l'air (c'est-à-dire dans un égouttoir omettent les portes de devant et arrière), avec le trou aérien de 2 centimètres aux côtés et au haut. Si on NE PERMET PAS QUE D'AIR S'ÉCHAPPE DE L'ARRIÈRE, LE FAIT DE SURCHAUFFER SE PRODUIRA. Faites attention en montant d'autre équipement dans le même égouttoir.
20. L'interrupteur principal sur les amplificateurs ne coupe qu'un pôle de l'alimentation secteur. le cordon IEC permettra de déconnecter l'appareil de l'alimentation secteur, pour cette raison l'accès à ces fiches (fiche mâle ou femelle) doit être facilités.
    Pour les appareils avec un câble d'alimentation fixe sans fiche secteur, le dispositif de coupure omnipolaire ayant une distance d'ouverture de contact d'au moins 3mm, sera le dispositif permettant la déconnexion complète de l'appareil.
    Pour cette raison l'installation et le raccordement de l'amplificateur devra ce faire conformément au réglementation en vigueur.

INSTALLATION EMC (RF Emissions)

The high frequency resonant converters in the **E Series** amplifiers have been designed to have very low radio frequency (RF) emissions, which can cause interference with other equipment. In order for this to be optimised, the amplifier should be mounted in a metal rack enclosure, which should have a separate (technical) Earth. Alternatively a separate earth should be attached to the amplifier at the rear rack mounting bracket.

INSTALLATION: MECHANICAL

To ensure that this equipment performs to specification, it should be mounted in a suitable rack or enclosure as described below. Like all high power amplifiers, it should be kept away from other equipment which is sensitive to magnetic fields. Also, this amplifier may suffer a substantial reduction in performance if it is subjected to, or mounted close to equipment which radiates high RF fields.

Warning: To prevent injury, this apparatus must be securely attached to the rack in accordance with the installation instructions

When mounting the amplifier in a rack or enclosure, ensure that:-

1. The rear of the unit is adequately supported. The brackets which are supplied fit standard 19 inch (483mm) rack mounting systems. THE FRONT PANEL IS NOT CAPABLE OF SUPPORTING THE UNIT ON ITS OWN.

2. THERE IS ADEQUATE VENTILATION. The cooling fans suck cool air in through the front and blow hot air out at the rear of the unit through the ventilating grills. The front and rear of the amplifier should have free exposure to the air (ie in a rack leave the front & rear doors off), with 2cm air gap at the sides. IF AIR IS NOT ALLOWED TO ESCAPE FROM THE REAR, OVER-HEATING WILL OCCUR. Take care when mounting other equipment in the same rack.

3. The rack unit has a separate earth connection (technical earth).

ALSO SEE MAINTENANCE SECTION, page 9.

General Information

Your **E90** power amplifier utilises a proprietary designed switching output (Class-D), which couples the advantages of extremely high power output levels with very high efficiency and yet maintains a high sonic performance consistent with MC^2 Audio philosophy.

Sophisticated internal controls and protection circuits maintain the amplifier at optimum performance level regardless of situation. Fan speed is varied as required to keep the amplifier within its temperature limits and signal limiters are included to protect speakers from clipped signals.

The amplifiers include full DC and short circuit protection to ensure trouble-free service even in 'harsher' environments.

The **E SERIES** introduces three user-controlled features previously not seen on MC^2 Audio amplifiers:

- -3dB indicators
- Power reduction control (PRC)
- User-settable gain/sensitivity (internal)
- Output Current limiters and dynamic power control.

The latest version now also has improved signal level indication with 3 green LEDs in a 'bar chart' format. This gives a much clearer indication of level to the operator. The -3dB and Limit LEDs continue the bar format.

-3dB INDICATORS

Part of the front panel signal level display, they will light up when the signal is approximately 3dB below the limiting point. The limiting point is set during production to be at the onset of clipping. The response times of the -3dB indicators (YELLOW) are faster than those of the limit indicators (ORANGE).

Power Reduction Circuit (PRC)

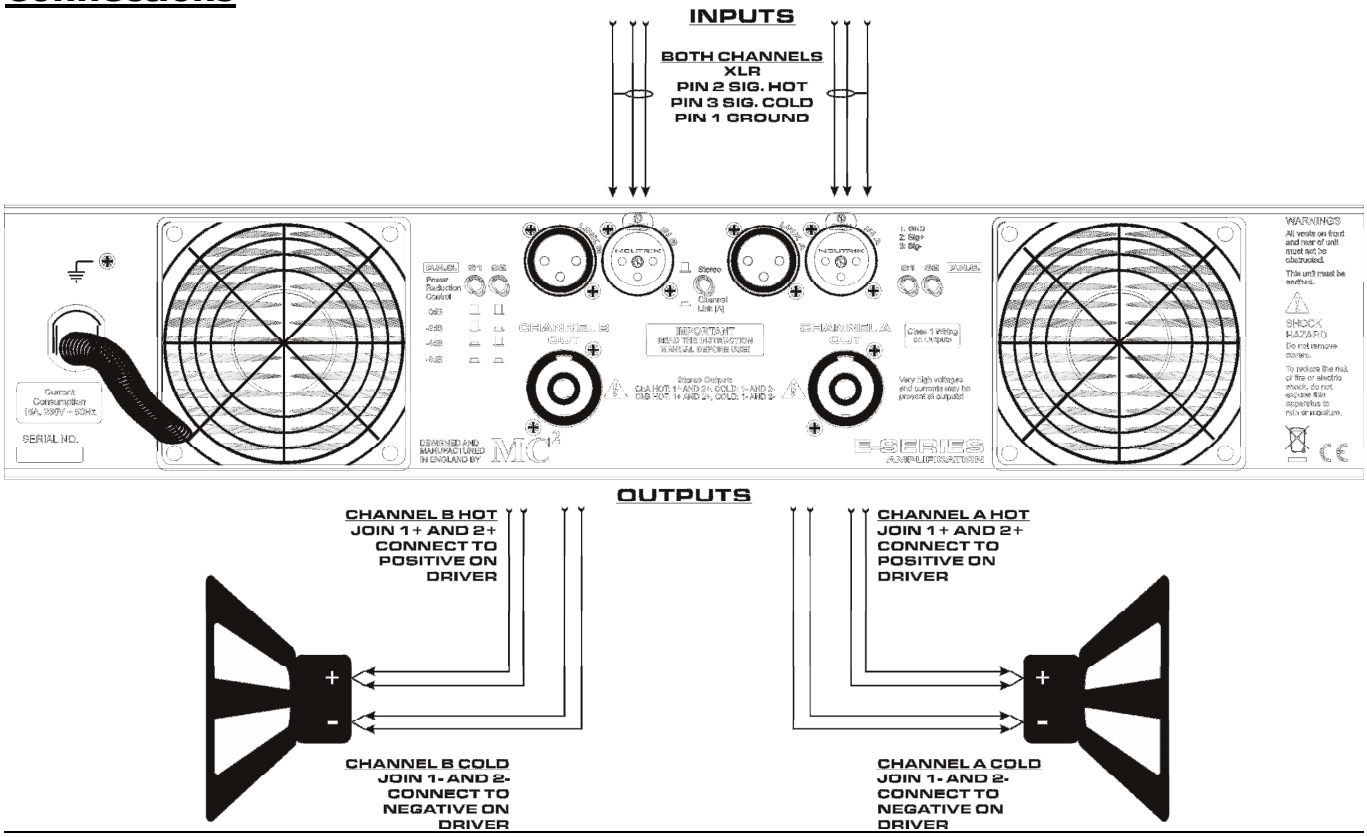
This enables the user to set a maximum output power level below the rated output of the amplifier. This reduction is controlled by switches on the rear panel, 2 per channel. Each channel has an LED indicator (GREEN) active when either PRC switch is selected. A full table of PRC settings and the resulting outputs are given in the Appendix. The possible settings are: -2dB, -4dB, -6dB. This relates to the maximum output of the amplifier. (See the chart in the Appendix section at the end of this manual.)

In bridged mode the Channel A PRC circuit operates over both Channel A and B. In this mode Channel B PRC is not used and is out of circuit.

Notes on Dynamic Amplifiers

The **E90** is the very latest example of a 'dynamic amplifier'. This new 'breed' of power amplifiers provide very high peak power levels in a much smaller, and lighter, package than previously possible with conventional amplifiers. They are designed specifically for today's high power audio installations, which use multiple speakers with electronic crossovers or speaker controllers. These systems can handle very high transient signals which far exceed their RMS power rating. The **E Series** amplifiers have been designed to match this requirement and can deliver huge levels of power for short durations. In order to protect themselves and the loudspeakers that they are driving, continuous signals, such as sine waves, are automatically detected and reduced (ramped down) to a safe level. When trying to **measure the power output** however, continuous signals will give totally incorrect results. A dynamic signal, such as a tone burst, should be used and the levels measured by monitoring the waveform on an oscilloscope. The power envelope can then be accurately measured.

Connections



INPUTS

Note: This amplifier is wired to the latest industry recommendations. PIN1 is connected directly to the chassis/mains earth. If ground loops (mains hum) are encountered remove the screen connection from the other end of the cable and leave it open circuit. If problems persist, consult your dealer/supplier, DO NOT TAMPER WITH OR ALTER ANY GROUND (EARTH) CONNECTIONS INSIDE THE AMPLIFIER.

The inputs are made via 3-pin XLR connectors, which are electronically balanced and should be connected via a high grade twin core screened cable, as follows:-

PIN1 - Screen (see note)
PIN2 - Hot (signal +)
PIN3 - Cold (signal -)

The amplifier is designed to operate with fully balanced equipment and ground loops or loss of performance may be experienced if connected to unbalanced sources. If it is unavoidable however, the following wiring should be used. The cable should still be twin core plus screen.

PIN1 - Screen - connected to the chassis of the unbalanced equipment - or left disconnected at the unbalanced end.
PIN2 - Signal Hot
PIN3 - Signal Cold

LINK SOCKET

Each channel is provided with a 3-pin XLR connector marked 'LINK' which allows the input signal to be linked to further amplifiers etc. The connections are the same as for the input XLR.

OUTPUTS

Channel A and Channel B speaker outputs are via Neutrik Speakon connectors. 4 poles are used. 2-pole (NL2FC) or 4-pole (NL4FC) connectors can be used.

Terminations are as follows :- Pin +1, +2 = +ve
Pin -1, -2 = -ve

NOTE: 1. Negative (-ve) output terminals from Channel A & B must not be joined together, since they are not both at 0V.

Because the currents involved are very high, the speaker cables should conform to the following minimum requirements, otherwise the losses will cause the cables to get hot and audio power will be reduced:

E90 - 25A into 4 ohm speaker loads.

Operation

SWITCHING ON

At 'switch-on' the protection circuit will initially activate whilst the circuits stabilise. Assuming no faults are detected after a few seconds, only the 'POWER' LED (and 'SIGNAL' indicators if signal is applied) will illuminate.

PANEL CONTROLS AND INDICATORS

Level controls

These are analogue controls allowing precise level settings. Note that in 'CH LINK' mode only 'channel A' control is active.

Signal Indicators (3 Green LEDs)

These are active from a minimum output level of approximately 10 Watts and are only an indication of signal level.

-3dB Indicators (yellow LED)

These are active when the signal is 3dB below the limiting level.

Limiters (Red LED)

The E Series amplifiers incorporate signal limiters, which are preset to prevent clipping with high levels of drive. The red LED's on the front panel illuminate to indicate operation of the limiters.

PRC Indicators (green LED)

These indicate when the PRC circuit for that specific channel has been selected with the rear panel switches.

Temperature Control

The cooling fans respond to temperature sensors within the unit to maintain a safe operating temperature. In the event of excessive temperature, the protection circuit will operate, disabling the output. The red 'AUDIO-PROTECT' (A/P) LED will indicate this condition. (See fault indicator.)

There are 2 fans connected permanently with variable speed.

Normal dynamic signals will not cause the amplifier to overheat unless the ventilation is inadequate. (See installation section and maintenance section.)

Fault Indicator (Audio Protection – red LED)

If the outputs are shorted or if DC is present, the protection circuit will disengage the outputs and the A/P LED will illuminate. The amplifier will continue to be monitored and depending on the type of fault, will either reset after the fault has cleared or require manual resetting by switching off at the mains switch and then on again after a few seconds. (See also temperature control above).

Temperature related faults will reset once the unit has cooled sufficiently.

Output short circuits will require manual reset after clearing the fault. Short circuits on either channel will affect the individual channel. A/P will illuminate together with the Limit LED on the shorted channel.

CH Link LED (green)

This indicates the position of the switch on the rear panel and is illuminated when CH Link mode is selected with the switch pressed in.

Maintenance

CAUTION: These servicing instructions are for use by qualified personnel only. Ensure that Electrical power to the unit is disconnected before carrying out any maintenance.

GAIN/SENSITIVITY SETTINGS

Gain settings are changed internally by simple jumper links. Two rows of pins marked - **GAIN A** and **GAIN B** - are situated on the input PCB (PCB751a). A jumper link sets the gain and the settings are as follows:

Link 1 & 2	gives	32dB gain	
Link 2 & 3	gives	approx. 35.75 dB gain	
Link 3 & 4	gives	38dB gain =	6dBu/1.5V sensitivity E90

NOTE: Factory setting is normally link 1 & 2 = 32dB gain.

Setting higher gain does not change the maximum available power but changes the level of signal input to achieve maximum power. In any case, provided that the input signal is less than 20dBu/7.7V, the built in limiter circuit will prevent distortion within the amplifier.

The gain should be set to match the signal from the source, e.g. mixer, controller, equaliser etc.

AIR FILTER

The filter behind the air intake apertures on the front of E SERIES amplifiers should be cleaned or replaced periodically, e.g. 3-6 months. (Filters in amplifiers located in more 'dirty' atmospheres may require more frequent maintenance). Access is via the blue front panel retained by 2.5mm Hex screws. The filter should be 'dry' cleaned, using a vacuum cleaner preferably. Running the unit without a filter is not recommended unless it is within a 'clean room'. Replacement filter material is available.

No other regular maintenance is required.

If you have any doubt about carrying out this procedure, refer to a service engineer or contact your dealer.

IF YOUR AMPLIFIER DEVELOPS A FAULT, PLEASE REFER TO YOUR SUPPLIER FOR SERVICE AND TECHNICAL SUPPORT. DO NOT ATTEMPT TO REPAIR THE FAULT YOURSELF AS THIS WILL INVALIDATE THE WARRANTY.

TECHNICAL SPECIFICATION

Main Specifications - E series Amplifiers

Parameter (Units)	E90	E45	E25	E15	E100	E475
Output Power (per channel) (Watts)						
8 ohms	2500	1250	700	450	1400	775
4 ohms	4800	2500	1350	850	2800	900
2 ohms	8200	4200	2400	1550	3700	NA
Output Power (bridged) (Watts)						
8 ohms	9600	5000	2700	1700	5300	1800
4 ohms	16400	8400	4800	3100	7400	NA
THD+N:(%)(4 ohms)						
@1kHz (@1dB below max output power) <	0.15	0.015	0.008	0.008	0.08	0.008
@20Hz to 20kHz (@3dB below max output power) <	0.5	0.05	0.03	0.03	0.15	0.03
Gain Options (dB)	32/36/39	26/32/36	26/32/33	26/31/32	26/32/36	26/31/32
Sensitivity Options (for maximum power) (dBu)	13/9/6	15.7/9.7/5.7	13/7/6	11/6/5	16/10/6	11/6/5
Sensitivity Options (for maximum power) (Volts)	3.5/2.2/1.5	4.7/2.4/1.5	3.5/1.7/1.5	2.7/1.5/1.4	4.9/2.5/1.5	2.7/1.5/1.4
Frequency Response - 20Hz to 20kHz (dB)	±1.0	+0 / -0.3	+0 / -0.3	+0 / -0.3	±0.5	+0 / -0.3
Power Consumption: Nominal @ 240v (4 ohms)(Amps)	5.6	4.5	3	2.1	7	2.7
Power Consumption: Nominal @ 120v (4 ohms)(Amps)	11.2	9	6	4.2	14	5.4
Dimensions: (mm)						
Amplifier: H x W x D	88 x 482 x 428					
Boxed (shipping UK): H x W x D	230 x 580 x 560					
Boxed (shipping - all except UK): H x W x D	250 x 610 x 600					
Weight: (Kgs)						
Amplifier:	11.78	11.42	10.16	9.8	12	10.62
Boxed:(shipping)	13.78	13.42	11.92	11.66	14	12.62
Additional Specifications						
Input Impedance - Active balanced (k ohms)	20	20	20	20	20	20
Input CMRR (dB)	>60	>60	>60	>60	>60	>60
Hum & Noise (dB below max output)	-105	-106	-105	-105	-105	-105
Damping Factor: @1kHz into 8 ohms	>400	>400	>400	>400	>400	>400
Signal Limiters - (set to prevent excessive clipping)	Yes	Yes	Yes	Yes	Yes	Yes
Protection: Short circuit / DC output / Temperature	Yes	Yes	Yes	Yes	Yes	Yes
Mains in-rush control.	Yes	Yes	Yes	Yes	Yes	Yes
Output Power (watts) into 8 ohms						
Sine wave @ 1kHz	2400	1100	650	400	1150	725
Continuous music with Crest Factor of 2.8 (9dB)	2400	1200	675	425	1300	750
Continuous music with Crest Factor of 4.8 (14dB)	2500	1250	700	450	1400	775
Continuous music with Crest Factor of 7.8 (18dB)	2600	1350	725	475	1480	825
Output Power (watts) into 4 ohms						
Sine wave @ 1kHz	4500	2050	1200	775	2250	750
Continuous music with Crest Factor of 2.8 (9dB)	4400	2400	1250	825	2600	825
Continuous music with Crest Factor of 4.8 (14dB)	4800	2500	1350	850	2800	900
Continuous music with Crest Factor of 7.8 (18dB)	5000	2700	1350	875	2900	900
Output Power (watts) into 2 ohms						
Sine wave @ 1kHz	7200	3300	2200	1350	3200	NA
Continuous music with Crest Factor of 2.8 (9dB)	6800	4100	2300	1500	3600	NA
Continuous music with Crest Factor of 4.8 (14dB)	8200	4200	2400	1550	3700	NA
Continuous music with Crest Factor of 7.8 (18dB)	8900	4300	2600	1600	3700	NA

Power requirements

The **E90** can be supplied for nominal mains voltage of 115V or 230V.

An internal link can be set to either 100V or 120V for the 115V version and 220V or 240V for the 230V version. Normally these are set to 120V and 240V respectively.

This amplifier will only operate to its very high specification if it is installed and operated as described in this manual.

APPENDIX

Table of PRC settings and average relative output – E90

	Output Per Channel (Watts)	Bridged Mode (Watts)
Max Power into 4ohm	4500	16000
-2dBu PRC Setting	3000	12000
-4dBu PRC Setting	1800	7200
-6dBu PRC Setting	1200	4750
Max Power into 8ohm	2150	8600
-2dBu PRC Setting	1200	4800
-4dBu PRC Setting	900	3600
-6dBu PRC Setting	600	2400
Max Power into 2ohm	8000	N/A
-2dBu PRC Setting	5500	N/A
-4dBu PRC Setting	3500	N/A
-6dBu PRC Setting	2250	N/A